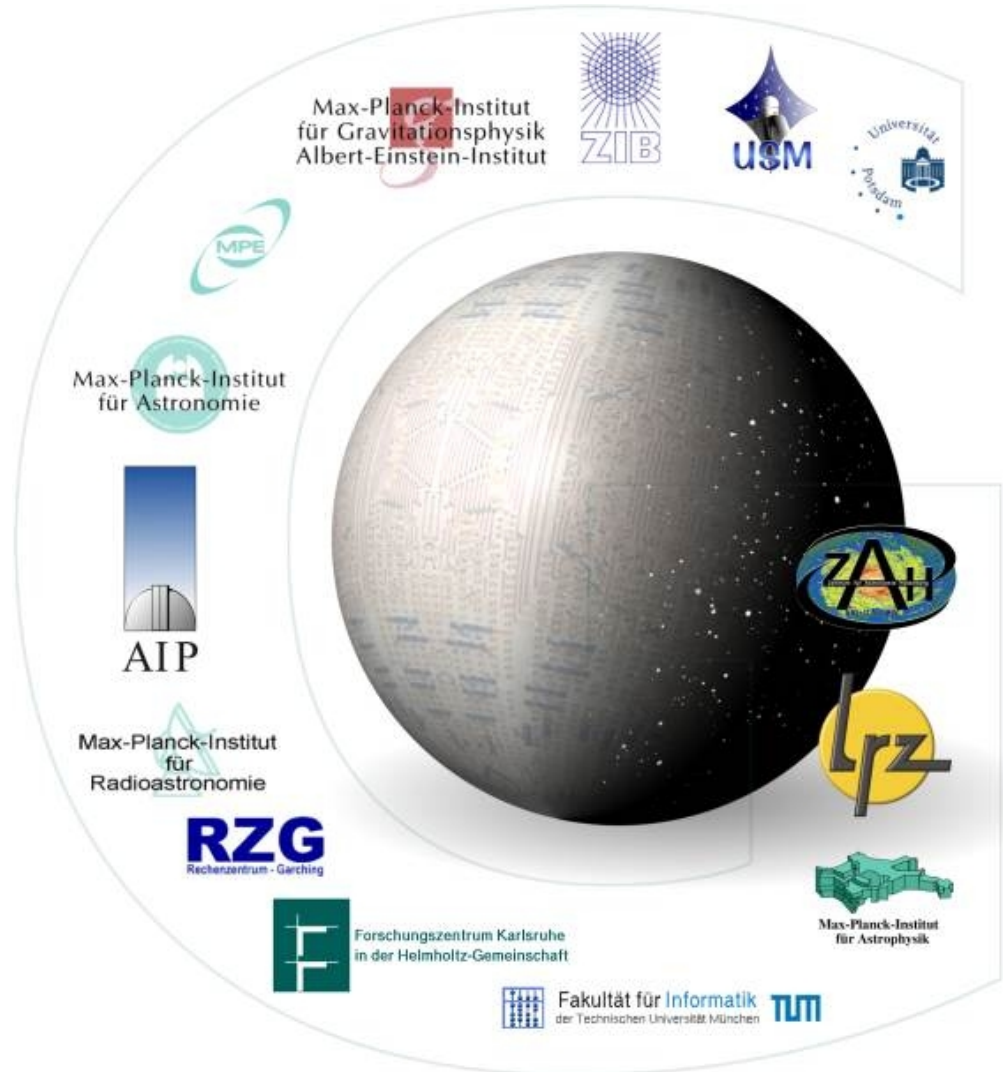
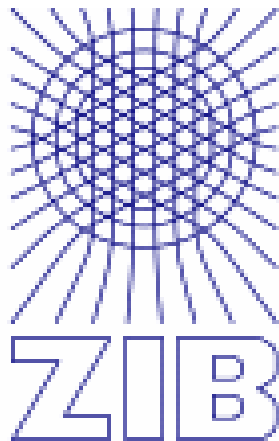




WG-3 Distributed File Management

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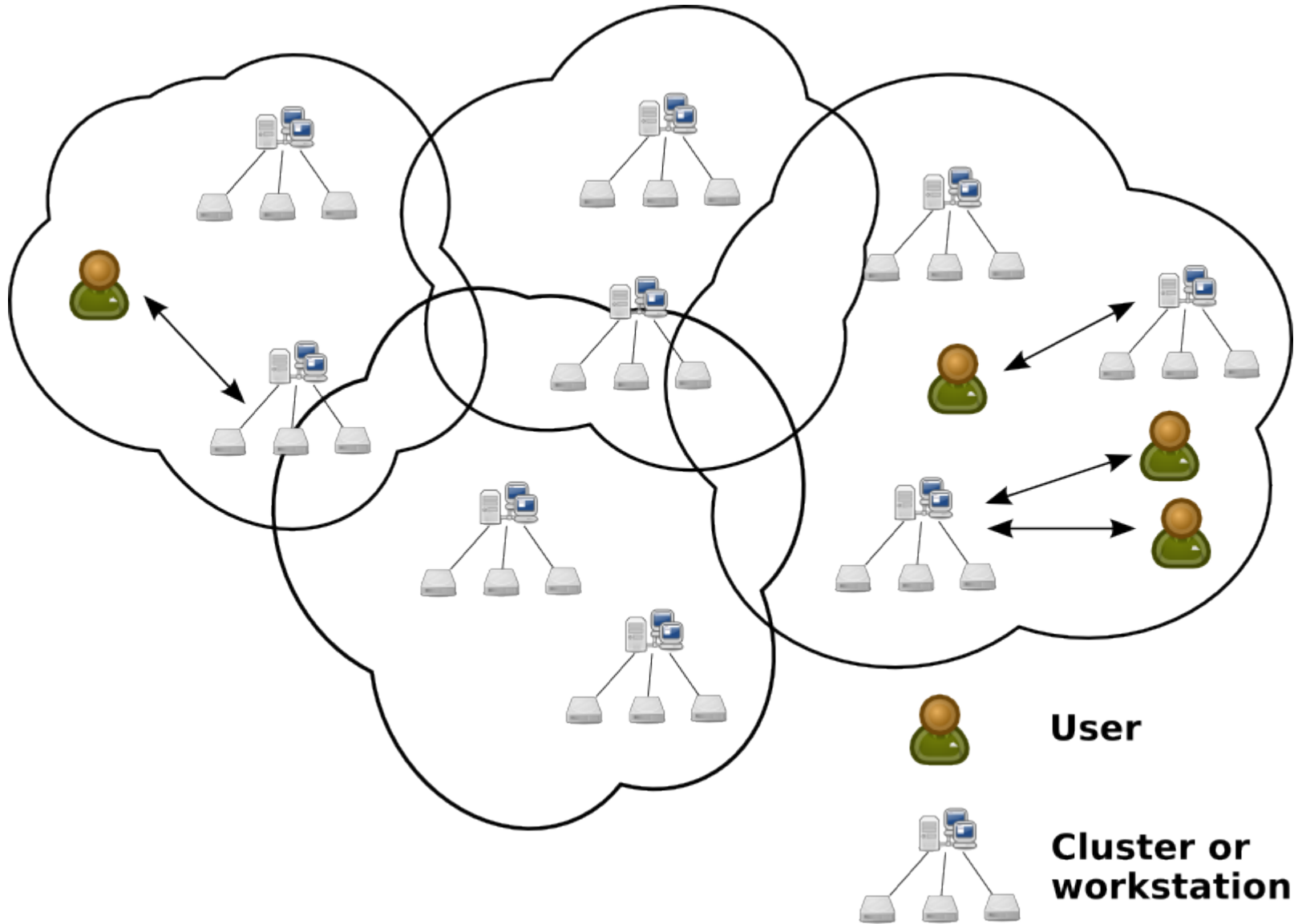


Introduction

- Background
- WG-3 goals
- User requirements
- Architecture
- Summary

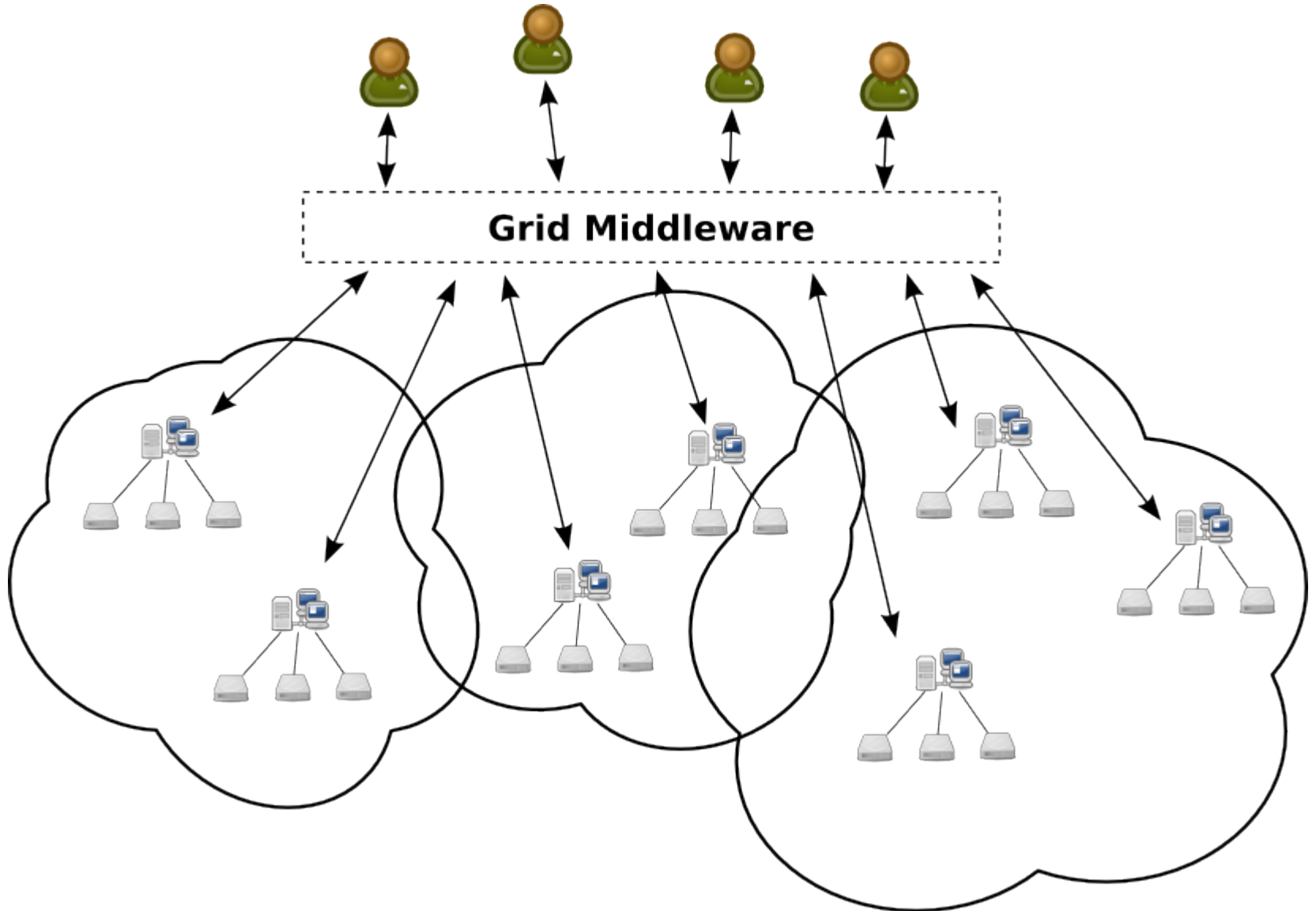


Current situation



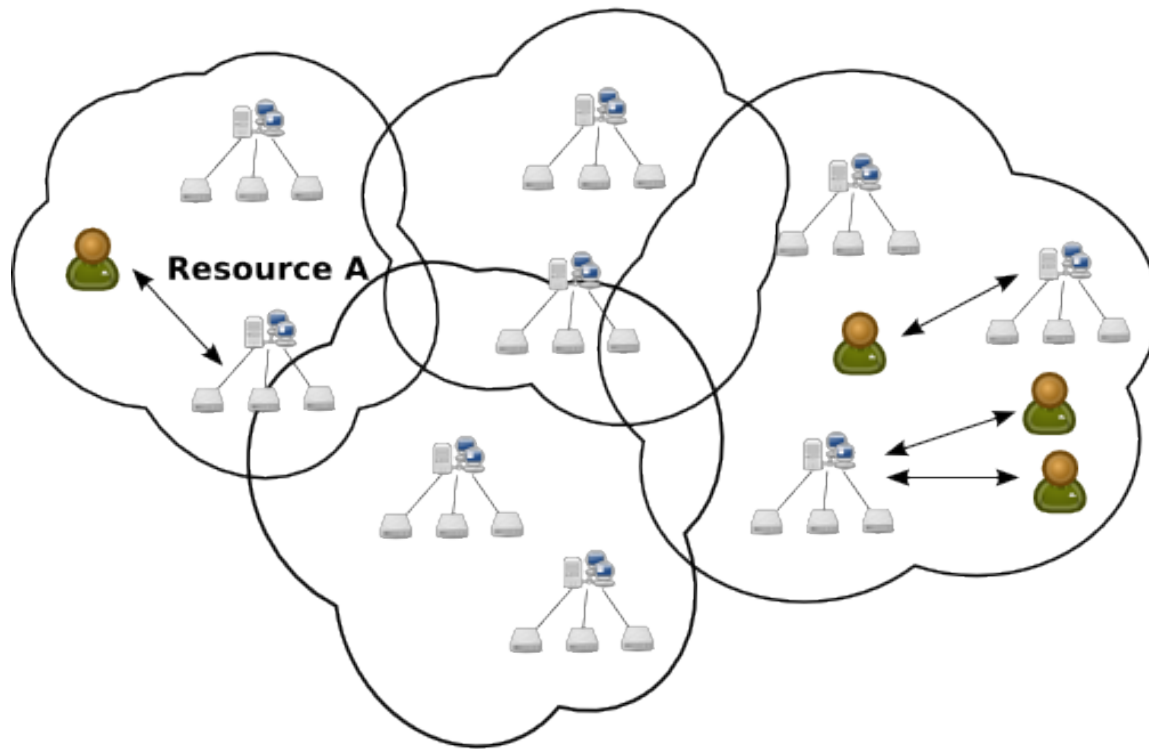


Grid Middleware

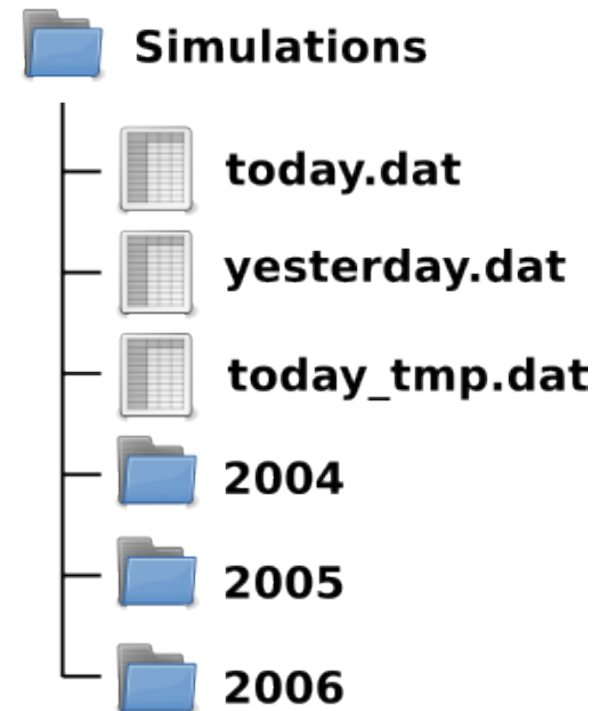




File management

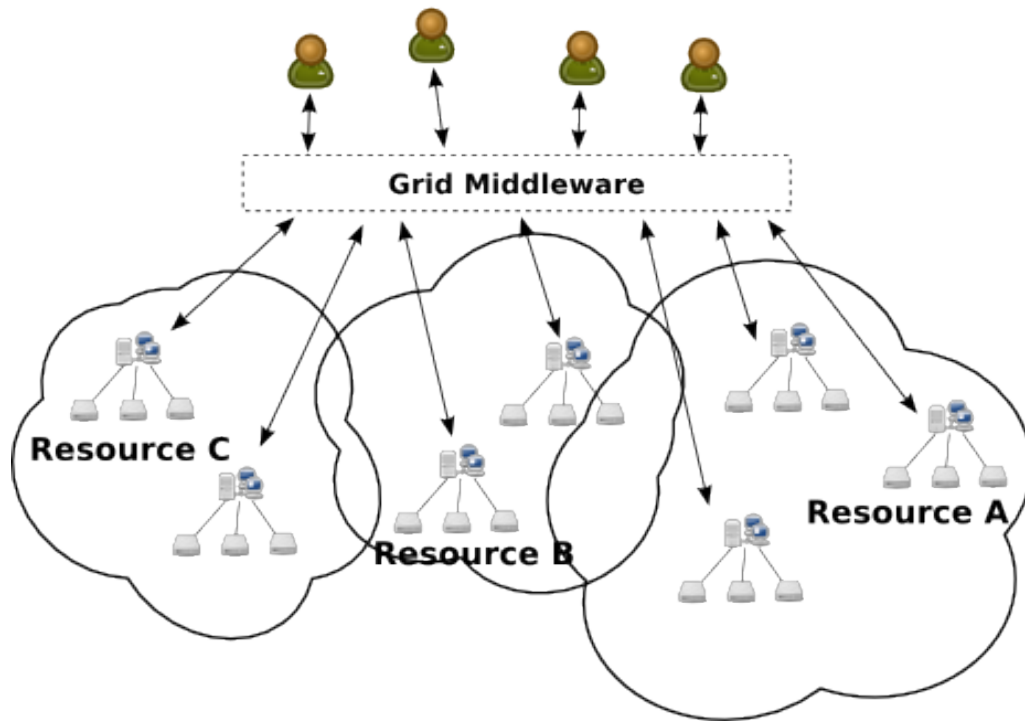


User data on resource A

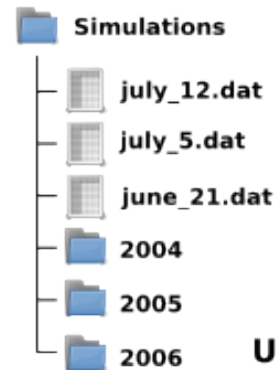




Grid File Management



User data on resource C



User data on resource B



User data on resource A





WG-3 Goals

- Provide software for managing files in a grid environment
 - ◆ Support the specific user requirements
 - ◆ Unified view of files stored on multiple resources
 - ◆ Collaboration
 - ◆ Efficient file access
 - ◆ Aggregate available storage capacity in the AstroGrid-D resources



User requirements

- Automated staging of input/output data
 - ◆ Solution: Globus, AstroGrid-D job management
- Access to stdout/err
 - ◆ Solution: Globus
- Interactive access to log- and intermediate result files
 - ◆ Solution: Globus
- Partial access to HDF5 files
 - ◆ Solution: GridFTP + plugin



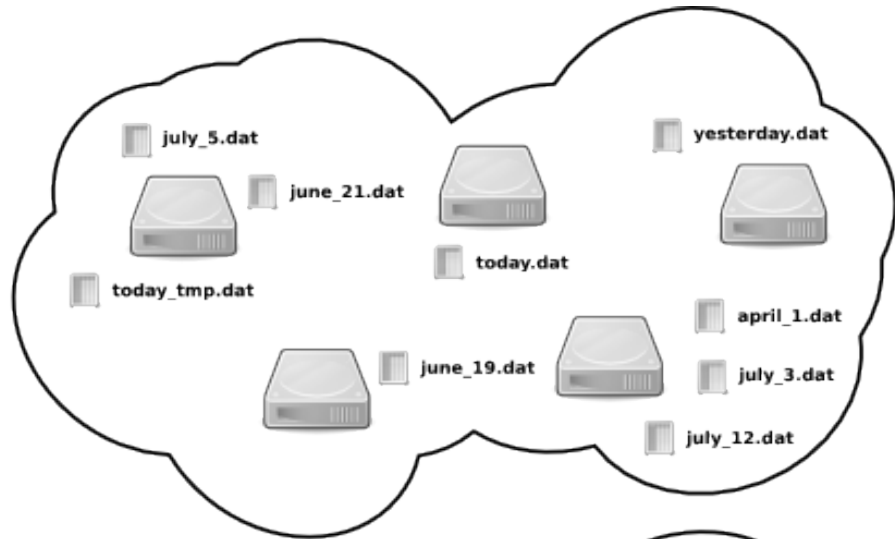
Storage layer

- AstroGrid-D resources and users provide storage capacity
- Unified view of files
 - ◆ Globally unique identifiers (LFID)
- Store job input/output files
- Share files within collaborations
- Relies on a structured overlay network

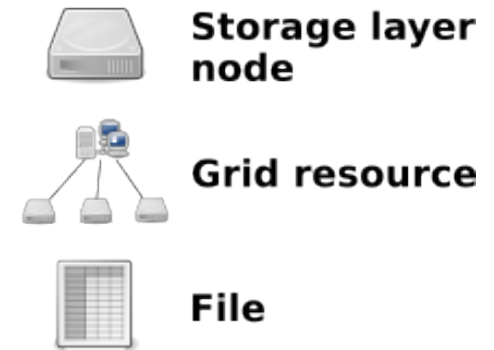
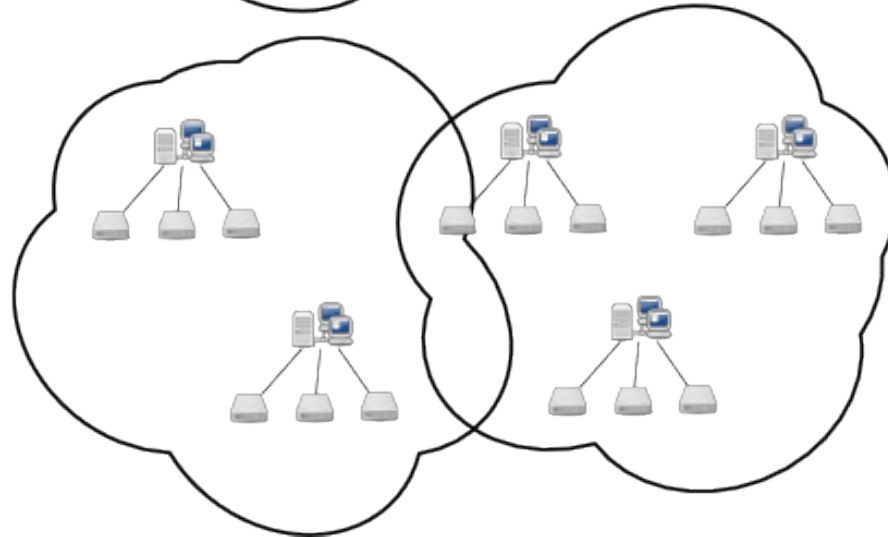


Storage layer overview

Storage Layer



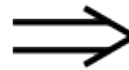
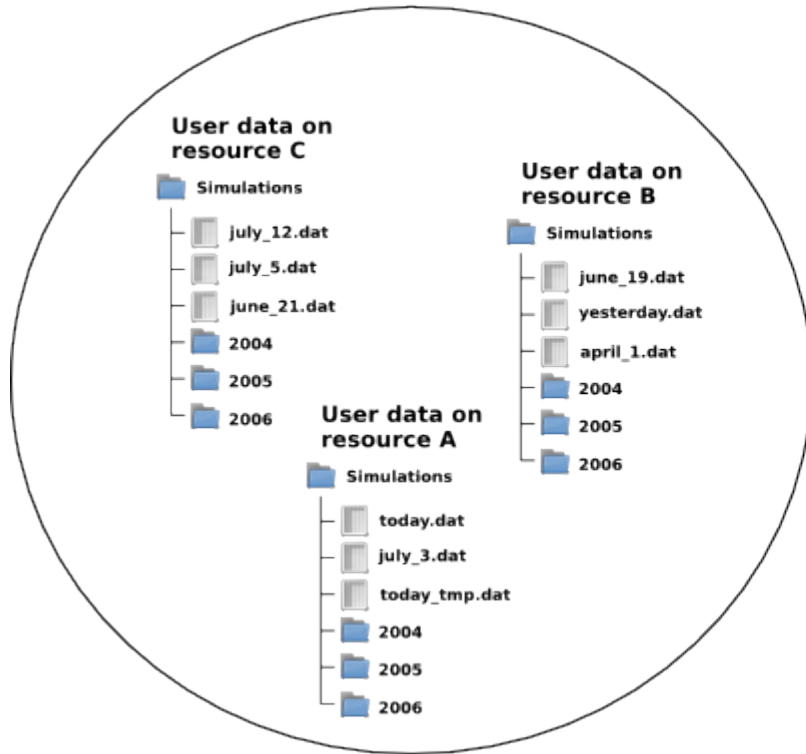
Internet



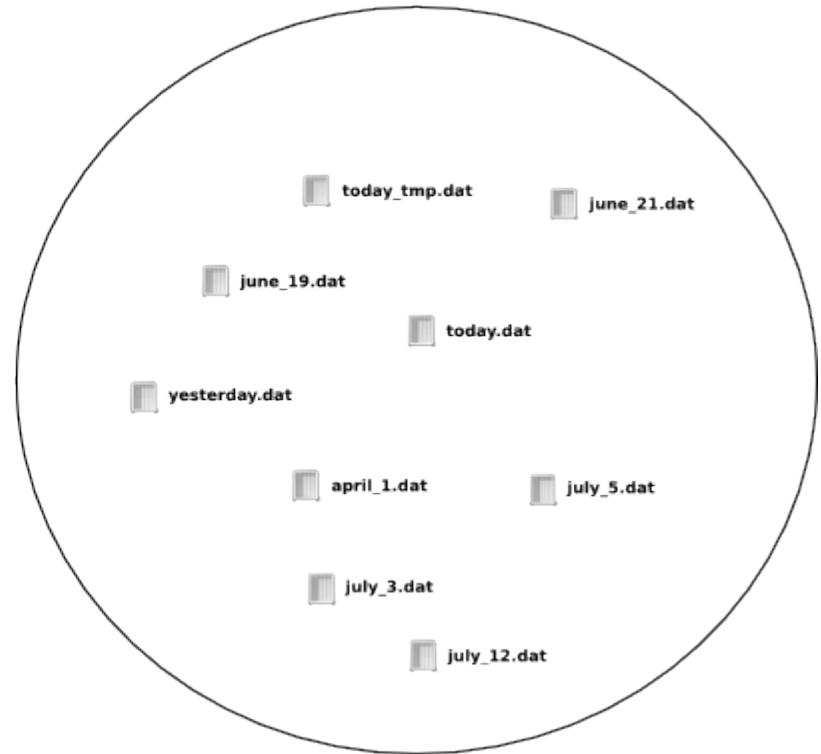


Unified view of files

User data before the Grid



User data in the Grid





Logical File Identifier (LFID)

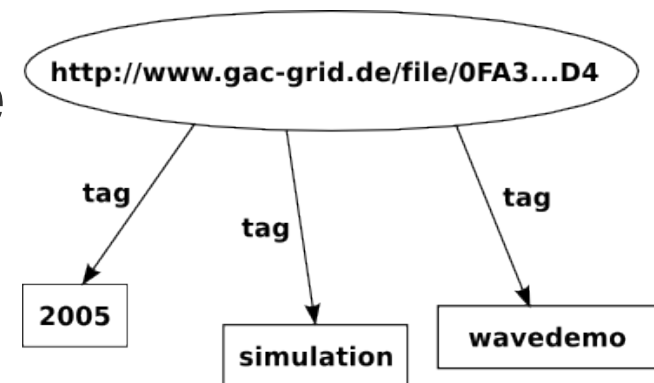
LFID	Location
0FA3...D4	http://resourceA/today_tmp.dat
497D...AA	http://resourceB/today.dat
877B...32	gridftp://resourceC/april_1.dat
9441...53	http://resourceA/july_5.dat
B4C9...8A	http://resourceB/yesterday.dat
C7E3...84	http://resourceB/june_21.dat
E102...42	gridftp://resourceC/july_12.dat
F04E...D9	gridftp://resourceC/july_3.dat
497D...AA	http://resourceD/today.dat
497D...AA	http://resourceE/today.dat

- Content-generated identifier
- Transparent access to replicas
- Index with mapping LFID -> Location



Metadata

- Metadata is used to find files (LFIDs) in the grid
- Associate metadata with the LFID and query via the Information Service
- Tags
 - ◆ Arbitrary string describing a file
 - ◆ Used to group files





Using the storage layer

- Run the storage node software to
 - ◆ contribute storage to AstroGrid-D
 - ◆ share your public with collaborations
- Organize your files by assigning metadata to LFIDs
- Storage for input/output data and checkpoint files



Summary and Outlook

- Specific user requirements are supported by Globus and GridFTP extensions
- Files in the grid are harder to manage since they are distributed over many resources
- Storage layer for storage and Information Service for organization/search of files
- Finish D3.1 due June 2006 (M1)
- Prototype ready in June 2007 (M2)

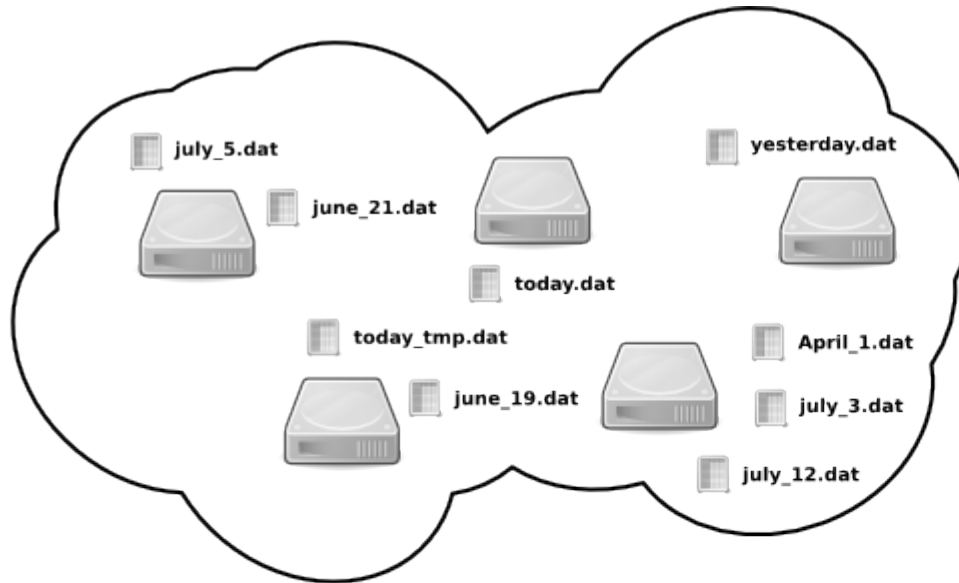


Structured Overlay Network

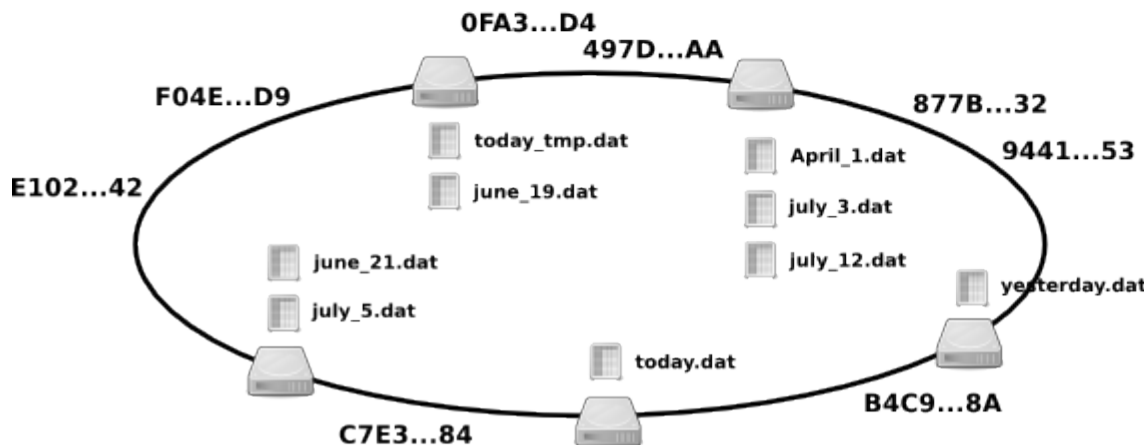
- Self-organizing distributed index
- Used to lookup location in the LFID -> location mapping
- Provides important properties
 - ◆ Self-organization (simplified deployment)
 - ◆ Efficient index lookup
 - ◆ Fault-tolerance



Structured Overlay Network



Storage Layer

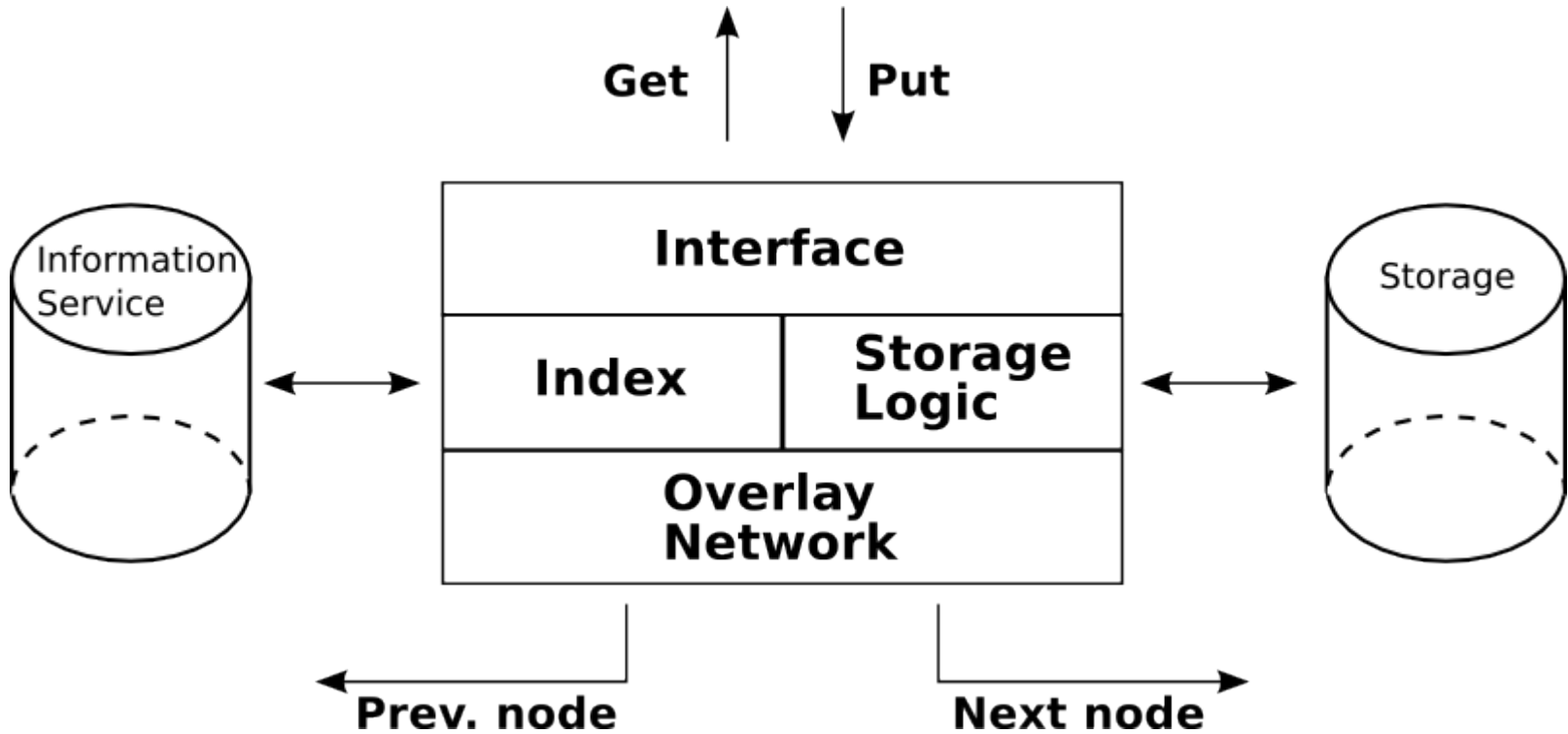


Structured Overlay Network





Node architecture





AstroGrid-D overview

